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November 26, 2018

Arthur Burbank  
USDA Forest Service  
4350 South Cliffs Dr.  
Pocatello, ID 83204

**Subject: Biological Selenium Removal Treatment Technology  
Water Treatment Pilot Study  
October 2018 Progress Report**

Dear Art,

This progress report summarizes key activities in October 2018 associated with Phase 2 of the Water Treatment Pilot Study located near Hoopes Spring. This Pilot Study is being conducted as part of the Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS) to provide information on the effectiveness of the active biological treatment system in removing selenium and other COPCs from South Fork Sage Creek Springs and Hoopes Spring.

Work related to the approved Phase 2 Pilot Study continues at the site in accordance with the *Final Phase 2 Pilot Study Work Plan and Sampling and Analysis Plan, Ultra-Filtration/Reverse Osmosis and Biological Selenium Removal Fluidized Bed Bioreactor Treatment Technology* (Phase 2 WP/SAP).

#### **Identification of Deliverables and Data Transmittals**

There were no outstanding deliverables or transmittals for the month of October. At the time of this report, we have received laboratory data for Week 33 and 34. No data was collected for Week 32 due to the system being down for annual maintenance on the clarifier instead the data was collected during Week 33. Preliminary laboratory data are presented in Table 1. The field data for the Week 33 and 34 sampling event is summarized in Table 2.

#### **Completed Activities**

The following activities associated with the Phase 2 Pilot Study were completed in October 2018:

- Continued system operation and treatment of selenium.

The Treatment System Pilot (TSP) influent concentration for Week 33 and Week 34 were 152 ug/L and 142 ug/L respectively. The Treatment System Pilot effluent concentration for Week 33 and Week 34 were 20.5 ug/L and 21.1 ug/L. The removal efficiency ranged from 84% to 87 % for total selenium removal.

The average flow of the TSP was 1671 gpm for October, this includes approximately three days of downtime for annual maintenance. Since full scale operations began in early December 2017 approximately 810 million gallons of impacted water has been treated. The mass of



selenium removed from December 2017 through October 2018 is approximately 822 pounds.

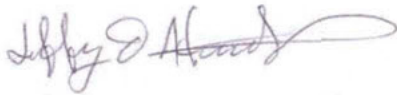
### Upcoming Activities

The following activities associated with the Phase 2 Pilot Study are planned through November 2018:

- Continue system monitoring in accordance with the sampling and analysis plan.

Please contact me if there are questions regarding this monthly progress report.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jeffrey Hamilton", with a stylized flourish at the end.

Jeffrey Hamilton  
Environmental Engineer

cc:

Arthur Burbank – USFS, 410 East Hooper, Soda Springs, ID 83276  
Sherri Stumbo – USFS, 4350 South Cliffs Dr., Pocatello, ID 83204  
Rick McCormick – CH2M, email only  
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**Table 1**  
**Laboratory Results Full Analyte List**

Hoopes Springs Water Treatment Plant Pilot Study  
Phase 2, Performance Monitoring

		Week 33			Week 34		
Station >>		Influent	Ultra Filtration Backwash	Effluent	Influent	Ultra Filtration Backwash	Effluent
Sample ID >>		SC1018-LSSHS-IN001	SC1018-LSSHS-UFB001	SC1018-LSSHS-EF001	SC1018-LSSHS-IN002	SC1018-LSSHS-UFB002	SC1018-LSSHS-EF002
Date >>		10/3/2018			10/10/2018		
Analyte	Units						
General Chemistry							
Ammonia, as N	mg/L	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Biochemical Oxygen Demand	mg/L	2 U	2 U	2 U	2 U	2 U	2 U
TSS	mg/L	2 U	2 U	2 U	2 U	2 J	2 J
Nutrients							
Nitrate, as N	mg/L	0.36	0.16	0.52	0.36	0.15	0.48
Sulfide	mg/L	1 U	1 U	1 U	1 U	1 U	1 U
Phosphorus, Total	mg/L	0.0293	0.0358	0.249	0.0185	0.00538 J	0.155
Metals and Metalloids							
Selenium, Dissolved	mg/L	0.142	0.0436	0.022	0.135	0.0217	0.0205
Selenium, Total	mg/L	0.152	0.0466	0.0226	0.152	0.0221	0.0211

**Notes:**

Results presented are preliminary, and have not been validated at the time of this report.

U - Analyte not detected above the method detection limit (MDL).

J - Result is estimated.

**Table 2 Field Water Quality Data**

Hoopes Springs Water Treatment Plant Pilot Study  
Phase 2, Performance Monitoring

		Parameter >>	Dissolved Oxygen	ORP	pH	SC	Temperature	Turbidity
		Units >>	mg/L	mV	SU	umhos/cm	C	NTU
Station	Sample ID	Date						
<b>Week 33</b>								
Influent	SC1018-LSSHS-IN001	10/3/2018	7.47	132	7.51	494	13.8	1.1
Ultra Filtration Backwash	SC1018-LSSHS-UFB001	10/3/2018	7.61	136	7.21	197	13.15	3.1
Effluent	SC1018-LSSHS-EF001	10/3/2018	7.17	131	7.41	498	13.07	1.5
<b>Week 34</b>								
Influent	SC1018-LSSHS-IN002	10/10/2018	10.57	33	7.66	499	13.24	3.1
Ultra Filtration Backwash	SC1018-LSSHS-UFB002	10/10/2018	6.83	35	7.55	87	13.1	6.6
Effluent	SC1018-LSSHS-EF002	10/10/2018	7.05	42	7.59	487	13.12	3.8